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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,464	10/07/2005	Kozo Murao	279302US0PCT	2239

22850 7590 06/29/2009

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EXAMINER	
LISTVOYB, GREGORY	

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
06/29/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/552,464	MURAO ET AL.	
	Examiner	Art Unit	
	GREGORY LISTVOYB	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al (Biotransformation of Acrylonitrile, Biotechnology and Bioengineering, vol 34 pp 380-386 (1989)), herein Hwang (cited in a previous Office Action) in combination with Abe et al (US patent 5476883) herein Abe, Ishii et al (US patent 6043061) herein Ishii (cited in a previous Office Action) and Murao et al (WO 02/50297 and US publication 2004/0048348) herein Murao (cited in a previous Office Action)

Hwang discloses a method for producing an acrylamide polymer comprising hydrating of acrylonitrile (ACN) with following enzymatic conversion of ACN to acrylamide and polymerizing monomers containing the acrylamide (p.381-382).

The enzymatic method carried out using microbial cells of a Nitrile Hydrataze as a catalyst (p.380-381).

Hwang does not disclose that concentration of Oxazole is less than 5 mg/kg or less and Hydrogen Cyanide concentration is 1 mg/kg or less.

Abe discloses a preparation process of Acrylamide from purified Acrylonitrile with following polymerization to Acrylamide polymer (see Example 1), where Oxazole is completely removed from Acrylonitrile (See Table 1, Example 1, where Oxazole is not detected with detection limit of 1.0 mg/kg (ppm)). Abe teaches that Acrylonitrile undergoes a purification procedure (see column 8, line 35), where Oxazole concentration reduces from 25 mg/kg to non-detectable limit (below 1 mg/kg) (see Table 1). Abe discloses that acrylamide required to be promptly dissolved in water with only trace amount of unreacted toxic monomer permitted (see Column 1, line 35).

Note that both Application and Abe teach that oxazole does not participate in the polymerization process, but contributes to water insoluble unreacted monomer (see Spec pages 2 and 3), affecting color (Spec) and toxicity (Abe) of the polymer. Therefore, the presence of oxazole as an impurity of the starting material is undesirable in any process of acrylamide production.

Abe teaches that Acrylamide, which has been synthesized by subjecting the Acrylonitrile to hydration has higher stability and when polymerized, provides an aqueous solution of higher viscosity compared with Acrylamide synthesized likewise from oxazole-containing Acrylonitrile (Column 2, line 20).

Ishii teaches a process for producing Acrylamide by enzymatically hydrating Acrylonitrile (see Example 1), where concentration of Hydrogen Cyanide is equal or less than 1 mg/kg (see Examples 1-3 and Tables 1-3).

Ishii teaches that decreasing a concentration of Hydrogen Cyanide leads to lowering a deactivation rate of an enzyme (See Column 6, line 65).

Therefore, it would have been obvious to a person of ordinary skills in the art at the time the invention was made to use Acrylonitrile with Oxazole concentration of 5 mg/kg or less and Hydrogen Cyanide concentration is 1 mg/kg or less in order to produce polyacrylamide with high viscosity and achieve higher catalytic activity of the enzyme (which relates to Hydrogen Cyanide) and to decrease insoluble toxic monomer content in the polymer (which relates to Oxazole).

Regarding new limitation of claim 1, stating that the acrylamide polymer is white in the form of a powder and is colorless in the form of an aqueous solution, since Hwang's polymer, modified with Abe and Ishii, would have the same structure as one, disclosed in the application examined, it would be expected that Hwang's Acrylamide would form white powder or colorless solution.

Hwang does not disclose that the reaction carries until the concentration of Acrylamide riches at least 30% by mass or more.

Murao teaches an enzymatic process of Acrylonitrile conversion to Acrylamide at the presence of microbial cell of a Nitride Hydrates, where reaction carries until Acrylamide concentration reaches 45% mass (see Example 1).

Therefore, it would have been obvious to a person of ordinary skills in the art at the time the invention was made to carry out the conversion of Acrylonitrile to Acrylamide until Acrylamide reaches the concentration of 30% mass or more in order to make economically sound process.

Response to Arguments

Applicant's arguments filed 3/18/2009 have been fully considered but they are not persuasive.

Applicant argues that Hwang's process is not an enzymatic one.

Examiner disagrees. According to Hwang, "Acrylamide was produced from acrylonitrile using immobilized Brevibacterium CH1 cells that were isolated from soil and found to possess nitrile hydratase activity" (see Abstract).

Regarding Abe and Ishii, applicant argues that the references represent processes, different from Hwang.

However, both Application and Abe teach that oxazole does not participate in the polymerization process, but contributes to water insoluble unreacted monomer (see Spec pages 2 and 3), affecting color (Spec) and toxicity (Abe) of the polymer. Therefore, the presence of oxazole as an impurity of the starting material is undesirable in any process of acrylamide production.

Applicant further argues that Abe and Ishii do not teach a polymerisation on purified Acrylonitrile.

This is incorrect. In Abe's process Acrylonitrile undergoes at least two purification steps (see Abstract), resulting in complete Oxazole removal from the starting material (see Table 1). Ishii teaches polyacrylamide formation, where purified Acrylonitrile used as a starting material (see Table 1, where HCN content is equal 1ppm).

Regarding Applicant's argument that Abe and Ishii do not teach the first polymerization step, the primary reference (Hwang) does teach such a step.

Regarding Murao, Applicant argues that the reference does not disclose the polymerization of acrylamide monomers prepared by hydrating acrylonitrile by using a nitrile hydratase.

Examiner disagrees. Murao teaches conversion of Acrylonitrile into Acrylamide by combining aqueous cell solution and acrylonitrile (see Example 1 (3).

Applicant argues that Hwang et al, Murao et al do not disclose or suggest the content of oxazole and hydrogen cyanide in the acrylonitrile starting material.

Examiner acknowledges the above fact in the previous Office Action. The secondary references of Abe and Ishii cure this deficiency (see discussion above).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/
Supervisory Patent Examiner, Art Unit 1796
GL